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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/550,891

09/27/2005

Mitsuaki Hata

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EXAMINER

JOLLEY, KIRSTEN

ART UNIT

PAPER NUMBER

1792

NOTIFICATION DATE

DELIVERY MODE

12/29/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/550,891	Applicant(s) HATA, MITSUAKI	
	Examiner Kirsten C. Jolley	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/15/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed September 23, 2009 have been fully considered but they are not persuasive.

Applicant argues that, conventionally, it is sufficient to perform either one of the spin-drying process and the reduced-pressure-drying process, and that economics and efficiencies strongly mitigate against using both types of processes in the same production line. The Examiner notes that Kitano et al. teaches in its Background section that a conventional spin coating process results in no more than about 10% of the thinner remaining when the process is complete (col. 2, lines 19-22), thus it is known that a conventional spin coating process includes drying ("spin-drying") as a result of the spinning used to spread the coating material on the substrate. Further, it is noted that Kitano et al. teaches in col. 25, lines 61-67 that its invention of a vacuum-drying process may be used in combination with a spin coating method (instead of a single stroke method). Therefore Kitano et al. teaches the combination of a spin-drying step and a reduced-pressure-drying step. Further, while use of two drying processes may be less economical or efficient, the combination of drying by both means together is none-the-less known. It remains the Examiner's position that it would have been obvious for one having ordinary skill in the art to have incorporated the reduced-pressure-drying step of Kitano et al. into the conventional spin coating process of Hata in order to obtain the discussed benefits of uniformity of film thickness of the coating film and also quick drying taught by Kitano et al. (col. 3, lines 4-18). *KSR* forecloses the argument that a **specific** teaching, suggestion, or

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motivation is required to support a finding of obviousness . See the recent Board decision *Ex parte Smith*, --USPQ2d--, slip op. at 20, (Bd. Pat. App. & Interf. June 25, 2007) (citing *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d at 1396) (available at <http://www.uspto.gov/web/offices/dcom/bpai/prec/fd071925.pdf>).

Applicant argues that Hata neither discloses nor suggests the two-stage drying process and the problems described in the present application. It is acknowledged that Hata does not teach a reduced-pressure drying process, however the Kitano et al. reference is relied upon for this teaching. Applicant further argues that Kitano aims to provide an apparatus to be used in place of the spin-coating process, and that Kitano et al. expressly rejects the use of the spin-coating process. While Kitano et al. is primarily directed to a single-stroke coating process in place of conventional spin coating, Kitano et al. teaches in col. 25, lines 61-67 that its reduced-pressure drying step may alternatively be used in combination with a spin coating process. Therefore Kitano et al. does suggest use of a reduced-pressure-drying step in combination with a spin coating process, as discussed above, since Kitano et al. also teaches that a spin coating process necessarily also results in drying of the thinner from the coating film.

Applicant argues that Hata and Kitano neither disclose nor suggest the claimed spin-drying process. The Examiner notes that it is well known in the spin coating art that some of the solvent in the coating solution volatilizes during spinning of the substrate thus resulting in some drying. Further, as discussed above, Kitano et al. confirms this phenomenon by teaching that a conventional spin coating process results in the vaporization of about 90% of its thinner.

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Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-2, 4-9, and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hata (US 2002/0000424) in view of Kitano et al. (US 6,676,757).

Hata discloses a method for manufacturing a mask blank by depositing a film of resist liquid on a substrate by a spin coating process, and thereafter covering the surface of the substrate with a covering member and performing removal by dissolving an unnecessary part of the resist film by supplying a solvent from above the covering member during the rotation of the substrate and the covering member together so that the solvent is supplied to the periphery of the substrate. It is well known in the spin coating art that in the process of performing spinning to spread the coating to the outer periphery of the substrate, some drying of the applied liquid also occurs ("spin-drying"). Hata lacks a teaching of performing a reduced-pressure drying process for the spin-coated resist film prior to performing the unnecessary-film-removing process. Kitano et al. similarly discloses a process for applying a resist film to a substrate and subsequently performing a coating film edge removal process at the outer periphery of the substrate (col. 11 and col. 12, lines 20-38). Kitano et al. also teaches the use of a reduced-pressure drying process, after coating of the resist film on the substrate and before the coating film edge removal (col. 11, line 62 to col. 12, line 19). Kitano et al. teaches that improved results are achieved when using reduced pressure drying as opposed to drying on a heating plate,

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which is conventionally performed after a spin coating process and before edge removal. Kitano et al. teaches that a reduced pressure drying process can be performed quickly and a temperature of the coating film can be maintained uniform, as well as uniformity of film thickness is maintained since reduced pressure drying eliminates variations in the amount of volatilization in the film (col. 2, lines 14-35 and col. 3, lines 4-18). Further, Kitano et al. teaches that its reduced-pressure-drying process may be used in combination with a spin coating process (col. 25, lines 61-67). It would have been obvious to one having ordinary skill in the art, having seen the references of Hata and Kitano et al. in combination, to have performed a reduced pressure drying process in the method of Hata prior to performed the edge unnecessary-film-removing process with the expectation of increased efficiency in the process and increased uniformity of coating thickness and temperature of the film. The test of obviousness is not express suggestion of the claimed invention in any or all references but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them. *In re Rosselet*, 347 F.2d 847, 146 USPQ 183 (CCPA 1965); *In re Hedges*, 783 F.2d 1038. Additionally, *KSR* forecloses the argument that a **specific** teaching, suggestion, or motivation is required to support a finding of obviousness. See the recent Board decision *Ex parte Smith*, --USPQ2d--, slip op. at 20, (Bd. Pat. App. & Interf. June 25, 2007) (citing *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d at 1396) (available at <http://www.uspto.gov/web/offices/dcom/bpai/prec/fd071925.pdf>).

As to claim 2, Hata discloses the spin coating process in paragraph [0003]. While Hata does not specifically teach use of a cup having an opening on an upside, the Examiner takes Official notice that such a configuration for a spin coating cup is very well known in the spin

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coating art. It would have been obvious for one having ordinary skill in the art to have used an apparatus having an upper opening in the absence of a showing of criticality.

As to claim 4, Kitano et al. teaches use of a suction pipe 42b and suction pump 42c located at the topside of the cup in Figure 5. However it is the Examiner's position that it would have been obvious to an engineer having ordinary skill in the art to have alternatively placed the pump and pipe at the downside of the cup with the expectation of similar results, as a matter of design preference, in the absence of a showing of criticality.

As to claim 5, it is the Examiner's position that the degree of vacuum is stepwise decreased in the process of Kitano et al. since the vacuum is turned on once the substrate is inside the container (col. 11, line 62 to col. 12, line 19). As to claim 9, it is noted that the substrate is stationary when the reduced pressure drying is performed.

As to claims 7-8, the difference between a maximum thickness and minimum thickness of the resist film in the process of Hata in view of Kitano et al. would necessarily be 50 angstroms or less after removing the peripheral resist film because the claimed process and that of Hata in view of Kitano et al. have similar materials and process steps. Additionally it is noted that the process of Hata in view of Kitano et al. would produce a uniform film as claimed in claim 8.

As to claim 11, Hata teaches that a baking process is performed after the edge removal in paragraph [0078].

As to claims 12 and 15, Kitano et al. teaches that the drying performed in a spin coating process ("spin-drying") results in about 90% drying. Such would necessarily result in the resist film formed at the periphery not having fluidity. As to claims 13 and 16, Kitano et al. teaches

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that reduced-pressure-drying dries the resist film to an extent not to flow by a temperature distribution in col. 13, lines 11-20.

As to claims 14 and 17, the substrate in Hata is quadrangular as illustrated in the figures.

4. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hata in view of Kitano et al. as applied to claims 1 and 6 above, and further in view of Okada (US 4,748,053).

Hata in view of Kitano et al. are applied as discussed above in section 3. The references lack a teaching of first applying the resist liquid at a first speed, and then spinning at a second, lower speed in the spin coating process. Okada is directed to a method of applying a resist film on a square photo mask substrate. Okada teaches that a uniform film is achieved on the square substrate when spreading of the resist occurs by rotating at a first speed, followed by drying during the spreading step by rotating the substrate at a second speed slower than the first speed (abstract and col. 2, lines 11-26). It would have been obvious for one having ordinary skill in the art to have performed the spin coating/drying process at two separate speeds, a first higher speed followed by a second lower speed as taught by Okada, in the process of Hata in view of Kitano et al. with the expectation of improved uniformity of the resist liquid coating since Hata is similarly directed to application of a resist film on a square photomask substrate.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C. Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Tuesday and Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kirsten C Jolley/
Primary Examiner, Art Unit 1792

kcj